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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,605	11/21/2003	Henricus A. Marquering	0142-0437P	8206

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EXAMINER
BLOOM, NATHAN J

ART UNIT	PAPER NUMBER
2609	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/07/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/07/2007.

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PTOL-90A (Rev. 10/06)

Office Action Summary	Application No.	Applicant(s)
	10/717,605	MARQUERING ET AL.
	Examiner	Art Unit	
	Nathan Bloom	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-9 and 12-23* is/are rejected.

7)☐ Claim(s) *10 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *11/21/2003, 5/03/2004*.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Antonacopoulos (Anton) ("Flexible Page Segmentation Using the Background").

Instant claim 1 encompasses a method of segmenting an image of pixels into a number of fields corresponding to a layout of elements of the image, the pixels having a value representing an intensity and/or color of a picture element, the method is comprised of the following steps: constructing a graph (overlay on image) having vertices and edges connecting the vertices on the basis of background areas in the image and said edges separate the fields (elements) of the image, and constructing a list of contiguous shortest cycles that together completely cover at least part of the image, and defining the shortest cycles of the list as the fields of the image. Anton discloses the isolation of fields of a page by identifying the white areas that surround the smeared areas of the image. The method as disclosed by Anton in section 2 of the document forms a series of vertices and edges around the elements of the page to be segmented and then traces the shortest path of these edges that enclose these elements. In particular section 2.3 contains details of the actual segmentation using the minimum (shortest) cycles that encircle areas that don not intersect. Furthermore, each line that encircles the element has a known length

and thus the actual length of the cycle is known. As can be seen in figures 6-8 these contours are indeed the shortest cycle and are contiguous. Instant claim 2 further limits the method of claim 1 wherein a weight is assigned to an edge and instant claim 3 further limits the weight to a Euclidean distance. As has been mentioned, Anton has disclosed that the shortest (minimum) cycle (path) is chosen and that the length of these cycles is known because the distances of the composing edges are known.

Instant claim 4 further limits the method of claim 1 wherein the step of constructing the list of shortest cycles comprises selecting an edge that can be part of at most a single shortest cycle, determining the shortest path that connects the vertices of said edge alternative to said edge, and combining said edge and said shortest path. As can be seen in figures 6-8 of Anton each edge can be a part of at most a single shortest cycle and the construction of the paths involves determining and connecting adjacent (alternative) vertices that share a common edge such that a contiguous shortest path is formed.

Instant claim 5 further limits the method of claim 4 wherein the selecting step, the edge that can be part of at most a single shortest cycle is an edge at an outer border of the graph. As can be seen in figures 6-8 the edges formed by the shortest path are the outer border of the graph.

Instant claim 6 further limits the method of claim 1 wherein said step of constructing the list of shortest cycles is an iterative process, wherein, after finding a shortest cycle the graph is reduced by removing any edge that is part of the shortest cycle and that cannot be part of a further shortest cycle, and then a next shortest cycle is determined. Furthermore, instant claim 7 further limits this method wherein the construction of the list of shortest cycles terminates when the graph does not have any remaining edges to be considered. Anton discloses beginning at a

certain segment and determining if it is part of a shortest cycle and if it is then it is removed from

consideration for further shortest cycles and then the next segment or edge will be considered

that is still in the list of "potentials". This is done until all potential starts have been removed

from the queue at which point there are no more edges to be considered and thus the search for

shortest cycles terminates.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   Claims 1, 9, 12-15, and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Antonacopoulos.

Instant claims 12-15 encompass the computer program product embodied on at least one

computer readable medium that stores the program product comprising computer-executable

instructions that when executed perform the methods of claims 1-2, 4, and 6. As per previous

rejection of instant claim 1-2, 4, and 6 Anton has disclosed the claimed method. Since Anton has

disclosed and performed this method then it is understood by one of ordinary skill in the art that

the method has already been implemented in software.

Instant claims 18-20 and 22 encompass the device that performs the method of claims 1-3 and 6. As per rejection of claims 1-3 and 6 by Anton the method has been disclosed. Furthermore, this method has been performed by Anton thus the hardware and software necessary to perform this method have been developed. The method performed by software also requires hardware to execute the software such as a PC and in combination with the appropriate software the PC becomes a device with an input unit, a graph constructor, a path-finding module, a list module, and a field definer, as well as a weigh assigner wherein the weight is the Euclidean distance. This would have been obvious to one of ordinary skill in the art to implement so as to allow one to perform the method as described by Anton. Furthermore, the device is further limited by claim 21 to include a device for displaying fields of the image after segmenting. Anton shows in figures 6-8 that the fields are displayed.

Instant claim 9 further limits the method of claim 1 wherein said step of defining comprises checking if a first shortest cycle encloses a 1st area that further encloses a 2nd area smaller than the first area and subtracting the second enclosed area from the 1st enclosed area. Anton has disclosed the method of claim 1 wherein areas are further segmented from another area (paragraphs from a page). Given that it is known to one of ordinary skill in the art that segmentation is the removal of a desired area from another area then it would have been obvious to one of ordinary skill in the art to remove a desired segmented area from another in order to obtain this segmented area for further processing.

5.   Claims 1, 8, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antonacopoulos in further view of Ittner (EP 0621553 A2).

Instant claim 8 further limits the method of claim 1 wherein the shortest cycle is determined by constructing a minimal spanning tree that represents all shortest paths from a root vertex to the other vertices, and the minimal spanning tree is represented in variables associated with the vertices of the graph. Anton discloses the limitations of claim 1 and the labeling of the vertices in the graph, but does not disclose the use of a minimal spanning tree. Ittner teaches a method of segmenting and then performing OCR on a text document. Ittner discloses in sections 4.2 through 4.3.2 the use of a minimal spanning tree that represents all of the shortest paths form a root vertex to the other vertices (edges connected by endpoints) and the vertices (endpoints) are associated with their x-y coordinates of the graph. Given that Ittner and Anton both solved the problem of finding and identifying the shortest paths it would have been obvious to combine the teachings of the two to obtain the benefits of using a minimal spanning tree.

Instant claims 12 and 16 encompass the computer program product embodied on at least one computer readable medium that stores the program product comprising computer-executable instructions that when executed perform the methods of claims 1 and 8. As per previous rejection of instant claims 1 and 4 Anton in combination with Ittner have disclosed the claimed method. Since Anton and Ittner have disclosed and performed this method then it is understood by one of ordinary skill in the art that the method has already been implemented in software.

6.   Claims 12, 17-18, and 23 rejected under 35 U.S.C. 103(a) as being unpatentable over Anton in further view of Stolin (US 6175844).

Instant claim 17 further limits the method of claim 12 wherein the computer executable instructions further perform a processing step wherein a reading order is determined for a field

corresponding to a segment and wherein the components within the field are joined to text lines in a direction corresponding to said reading order. Anton discloses the segmentation and the fact that the order is known but not that it is determined or that these components are joined. Stolin discloses defining the text blocks (reading order and orientation) and then combining them in a direction corresponding to the reading order as can be seen in figures 1-10. It would have been obvious to one of ordinary skill in the art to combine the text/figure segmenting methods of Anton and Stolin to provide the user or OCR coding with readable lines of text. The programming of such a segmentation model is known to one of ordinary skill in the art and has been claimed by Stolin. Furthermore, in figure 10 the required hardware to construct this device is shown thus the limitation of instant claim 23 have been met.

Allowable Subject Matter

7.   Claim 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The cited prior art does not sort the enclosed areas by size or the removal of an inner enclosed area from another enclosed area.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Abdel-Mottaleb (US 6263113 B1) discloses the use of a Euclidean Minimal Spanning Tree for identifying the shortest cycles in a page segmentation scheme.
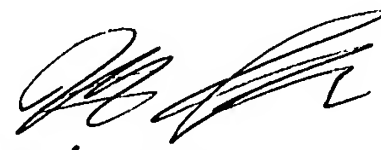
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Bloom whose telephone number is 571-272-9321. The examiner can normally be reached on Monday through Thursday from 7:30 am to 5:00 pm (EST). The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Stucker, can be reached on 571-272-0911. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

01/09/2007   Nathan Bloom

3/1/2007

JEFFREY STUCKER
SUPERVISORY PATENT EXAMINER